

Property of
Lake and River Enhancement Section
Division of Fish and Wildlife/IDNR
402 W. Washington Street, W-273
Indianapolis, IN 46204

"T BY 2000"
INDIANA LAKE AND RIVER ENHANCEMENT
CONSULTANT'S REPORT

SHIPSHEWANA LAKE SHORELINE
STABILIZATION PROJECT

MAY 1997

Prepared For:

Indiana Department of Natural Resources
Division of Soil Conservation
402 West Washington Street, Room W-265
Indianapolis, Indiana 46204-2748

Prepared By:

F. X. Browne, Inc.
P. O. Box 401
Lansdale, PA 19446

HUC 0405001120070

1.0 Introduction & Project Description

1.1 Introduction

Lake Shipshewana is approximately 205 acres in size and was created in the early 1960's through the installation of a sheet pile dam. This dam discharges into Page Ditch, which is the only lake outlet. The lake has two inlets: Mud Lake Ditch on the west side of the lake and the Sarah Davis Ditch on the south side.

The Shipshewana Lake Watershed encompasses approximately 4,675 acres, with predominantly agricultural land uses. However, low density residential use is increasing. The land adjacent to the lake is heavily developed with single family residences and a church camp. The eastern shore was developed in the mid 1960's. At that time, the marsh that existed at the mouth of Mud Lake Ditch was filled in with material dredged from the lake. The northeastern shoreline was developed in the late 1960's and was originally used for pasture land. Three channels have been excavated at the north end of the lake for access to new development.

1.2 Reason and Purpose for the Project

Since the late 1970s the water quality and general condition of Shipshewana Lake has declined dramatically. In 1986 the lake was classified as a *Class Three Lake*, which is considered an advanced eutrophic lake of the lowest quality (Indiana Department of Environmental Management , Indiana Lake Classification System and Management Plan). It was classified this way due to a total phosphorus concentration of 0.045 mg/l and a Secchi disc transparency of 3 feet. A Eutrophication Index value of 51 was calculated for the lake (scale 0-75). In addition, extreme blue-green algae blooms are common during the growing season resulting in Secchi disc transparency readings of .5 feet.

A thick, unconsolidated layer of organic sediment exists on the lake bottom all year round. During peak growing season anoxic conditions persist in this layer as well as in the water column above it. As a result, lake use has suffered, swimming has been banned, boating is hampered due to algae scums and fishing has declined. The receiving streams (Page Ditch, Pigeon River) are impacted as well.

This entire project proposes several Best Management Practices (BMPs) to address water quality problems: shoreline stabilization, dredging, two constructed wetlands, and environmental education. Shoreline stabilization, one component of this comprehensive approach, is designed to significantly reduce sedimentation and pollutant loads to Shipshewana Lake for the purpose of improving the water quality and recreational value of the lake. It will significantly control erosion and sedimentation.

1.3 Project Approach & Project Plans

The western shore of Shipshewana Lake (See Figures 1 and 2, Appendix A), known locally as "Starwood Hills", was developed in the mid 1960's. At this time wetland soils were dredged from the lakeward edge of the marsh that existed at the mouth of the Mud Lake Ditch to fill the landward edge of the same marsh. The resulting filled area is 1-2 feet above the normal lake elevation and is very unstable. The fill material and original underlying material is highly organic in nature. It is listed as "muck" in the LaGrange County Soil Survey and is very poorly drained. The shoreline of this filled area is highly erodible, with large pieces of muck falling into the lake where vegetation has not been adequately established (See Photos Appendix B).

The northeastern area of the lake (See Figures 1 and 3, Appendix A), or "Carpenters Addition", is predominantly made up of well-drained or moderately well drained soils (Udorthents loamy-Ud). This shoreline has also experienced severe erosion. In both shoreline areas several residents have constructed various types of bulkheads to prevent erosion. However, the soils are so unstable that some of the bulkheads have moved toward or fallen into the lake. Another approach to shoreline stabilization is needed.

Shoreline stabilization will be accomplished through bioengineering techniques. The chosen technique will involve the use of a natural substrate called **coir fiber bundles** in combination with selected wetland vegetation (See Figures 4 & 5, Appendix A). The coir fiber provides temporary stabilization (approximately 3 years) until the wetland vegetation becomes established with fully developed root systems. The vegetation will then assume erosion control. Approximately 4,500 feet of shoreline will be stabilized using this method. The plant materials include: upland grasses, woody wetland vegetation and grassy wetland vegetation. The coir fiber bundles and vegetation will be installed by the owner or a selected contractor during the Spring and Fall of 1997, which are the seasons most beneficial to the plant material. The bidding documents for this effort are included in Appendix C.

Shoreline stabilization will be implemented in one phase to be completed in the Spring of 1997, and will address those areas with severely eroded banks along both the western and northeastern shorelines. The project is expected to begin in April of 1997 and end in June 1997.

2.0 Permits, Erosion Control Notes, Maintenance, Inspection, & Monitoring

2.1 Permit Descriptions

The following permits applications have been submitted. Pertinent information regarding permit status is as follows:

- We received Army Corps of Engineer nation wide permit application approval (33 CFR 325) on December 18, 1996. The File number is 96-144-606-OGC. The permit approval letter is included in Appendix D.
- We received Indiana Department of Natural Resources (IDNR), Division of Historic Preservation and Archeology clearance on January 30, 1997. The approval letter is included in Appendix D.
- We received IDNR, Division of Water Quality (Construction In or On a Public Freshwater Lake) administrative approval on December 31, 1996. The file number is PL-17, 260. The approval letter is included in Appendix D. We are still awaiting final environmental review approval. The application was submitted on December 1, 1996.
- All landowners and adjoining landowners were notified about the project by certified mail in October 1996, and then by a public notice in the Goshen News on November 27, 1996. The IDNR permit contained a copy of each "green card". The public notice is included in Appendix D.
- An erosion and sedimentation plan was submitted on October 15, 1996 requesting the pre-design review. Two minor review comments were addressed, and the final plan was submitted April 2, 1997.
- An NOI letter and short project description was submitted to the Indiana Department of Environmental Management (IDEM) to comply with 327 IAC 15- on April 2, 1997. The NOI letter, public notice, and certification statement is included in Appendix D.

2.2 Erosion Control

The following erosion control notes were included in the Erosion and Sedimentation Control Plan. This plan will be followed by the Shipshewana Lake Improvement Association and their chosen contractors:

1. It shall be the responsibility of the Contractor to implement this erosion and sedimentation control plan in the field and meet all applicable regulations.

The Contractor shall assign the responsibility of erosion control to a person experienced in the procedures. Modifications or deviations from the plan will be allowed only if the Contractor first obtains written permission from IDNR.

2. The Contractor is responsible for the following requirements in the General Permit Rule for Stormwater Discharges Associated with Construction Activity of the Indiana Department of Environmental Management (IDM), (327, IAC 15-5, "Rule 5").
3. The Contractor shall familiarize himself and shall be responsible for carrying out all requirements stated in the IDEM's General Conditions for Construction Activity and Erosion Control Measures (IAC 15-5-7).
4. A 48 hour notice should be given to the LaGrange County Soil and Water Conservation District, 910 S. Detroit St., LaGrange, Indiana 46761 before the project begins. Construction will not take place until all federal, state and local permits are obtained and all notification requirements complete.
5. Particular attention shall be given to areas of steep topography and erodible soils. Graded areas shall be kept to a minimum and the shortest practical distance ahead of construction.
6. Newly graded areas will be planted as the project progresses.
7. Corridors for equipment travel and foot travel shall be established. Instructions shall be issued that routes for convenience shall not be allowed and that established travel corridors must be used. These instructions shall be strictly enforced, and traffic shall be kept to an absolute minimum. Since plant and other materials (Coir fiber, stakes etc.) will be required all traffic shall enter and leave on a designated access route. Laborers shall walk from the street rather than drive and shall park on stabilized areas whenever possible.
8. Earth slopes shall be protected from accelerated erosion as soon as possible after grading. This shall be done by the establishment of vegetative cover both on the upper and lower portions of the slope and within the Coir Fiber Bundle material.
9. Existing vegetation will be preserved, and new vegetation shall be planted as specified on the drawings, in the planting plan and in applicable sections of specifications.

10. Where grading is close to the lake, construction shall be performed in a manner which will not contribute to pollution. Any debris, brush, rocks, refuse and topsoil shall be kept as distant from the lake as possible. Construction practices shall follow the requirements in the specifications.
11. Stabilization as an erosion control practice will not function properly if stabilized areas are not well-maintained. Periodic inspections shall be made at sufficiently frequent intervals to detect any impairment in the ability of the project to function effectively. Maintenance shall be performed to allow the stabilization structures to perform the functions for which they were designed.
12. Vegetation should not be allowed to deteriorate and become ineffective. Proper pruning of woody vegetation shall be practiced, and reseeding or replacement of emergent vegetation shall be carried out where failures have been experienced.

2.3 Maintenance Plan

Coir Fiber Bundles are designed to biodegrade in approximately 3 years. Within that time period the bundles should be maintained and replaced if needed. Reseeding the slopes or replanting emergent vegetation or woody plant material will also take place if needed. Plants will become established and virtually maintenance free within approximately one growing season.

Maintenance of plant material may involve pruning woody plants if they become too tall or bushy. The pruning schedule will be based on homeowner preference and will occur in the early spring (before budding) or late fall (after dormancy).

Each landowner is expected to properly maintain their stabilized area. A maintenance and planting plan is included in Appendix E. However, the Shipshewana Lake Community Improvement Association has acquired the proper warranties for both the coir fiber bundles and wetland plant materials in case of plant material or coir fiber inadequacy.

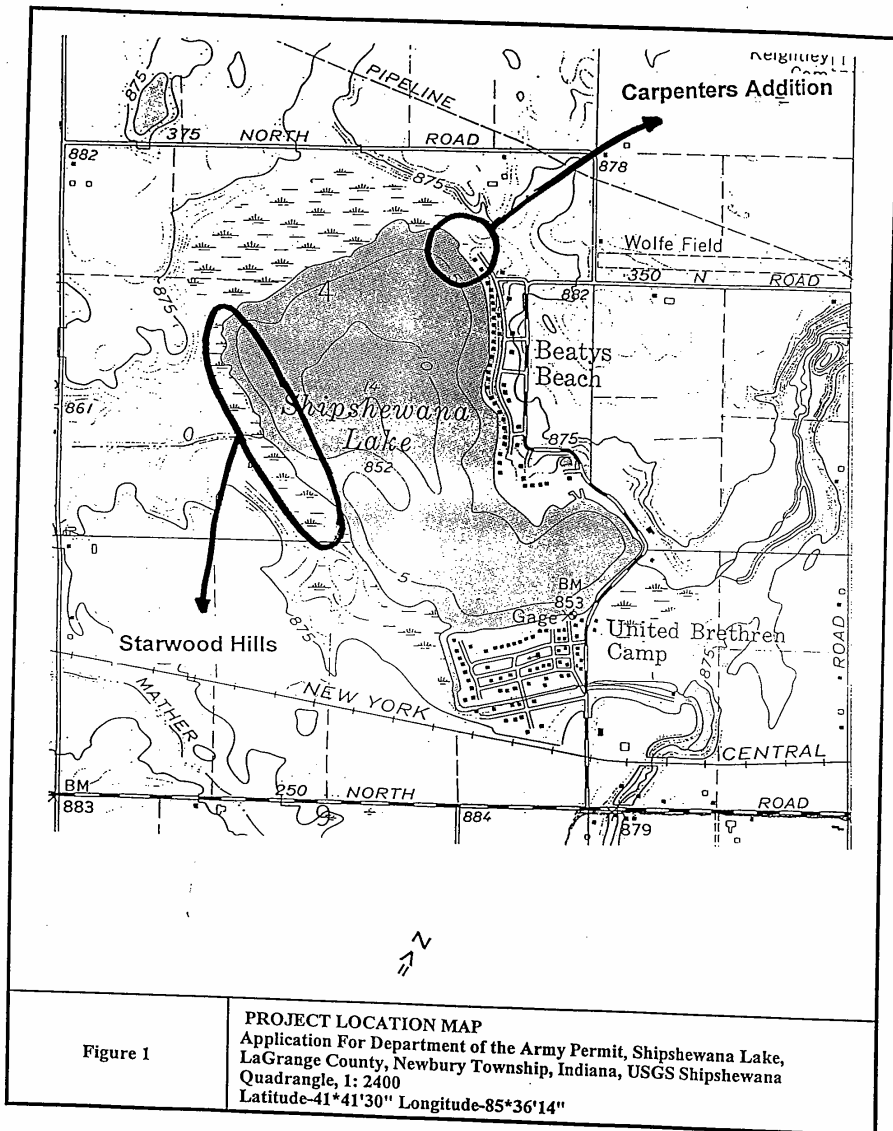
2.4 Inspection & Post Monitoring

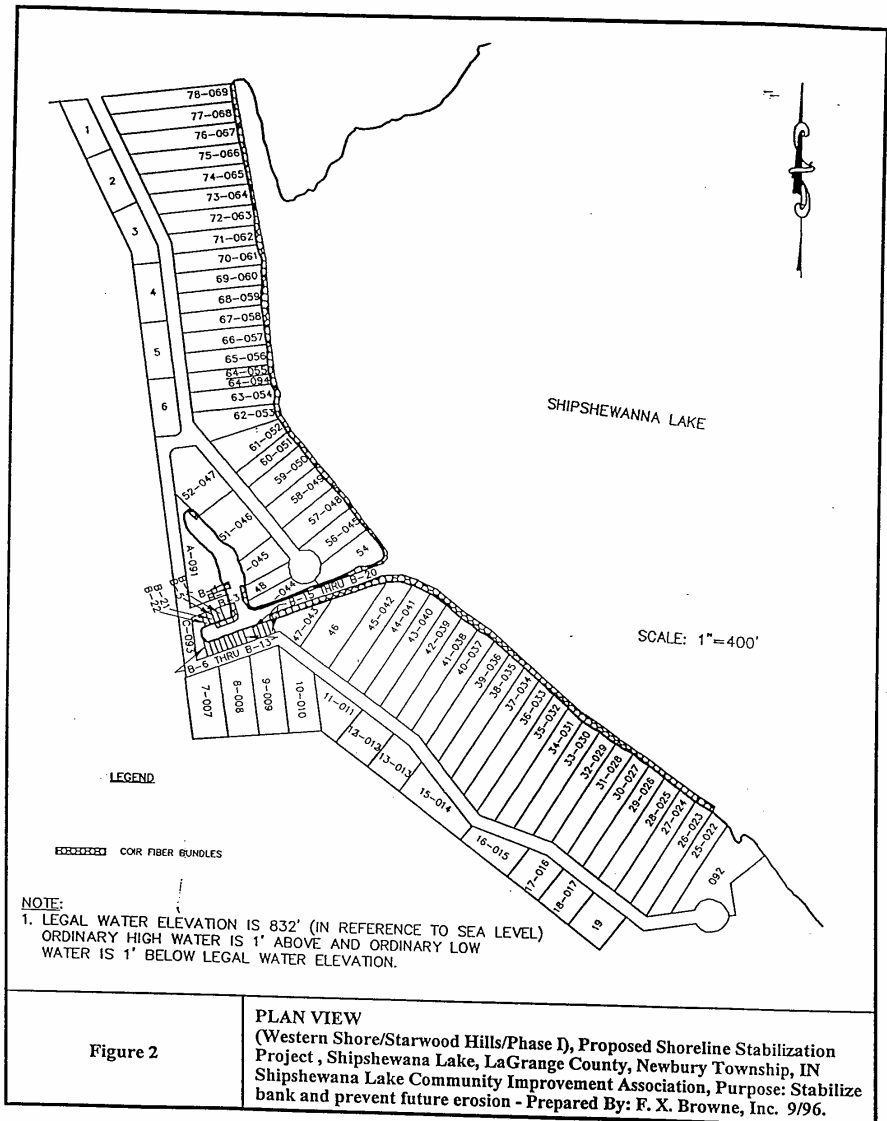
We are still awaiting an IDNR permit. However, we have heard from the Agency verbally in regard to required inspection and monitoring requirements. To meet permit requirements, the Shipshewana Lake Community Improvement Association will inspect project performance. The Association will also take photographs of the area and submit them to IDNR.

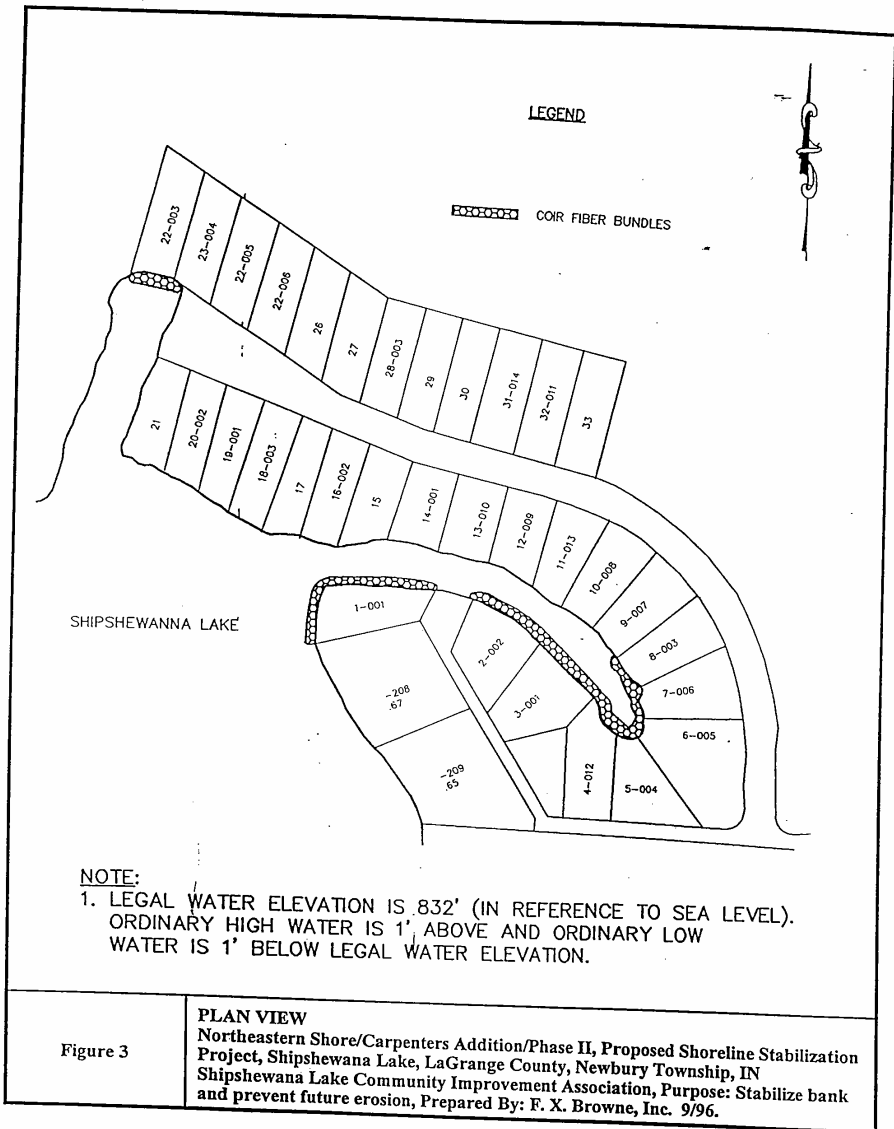
In addition, the LaGrange County Soil and Water Conservation District must be notified 48 hours before the project begins. Inspection visits by that Agency are expected.

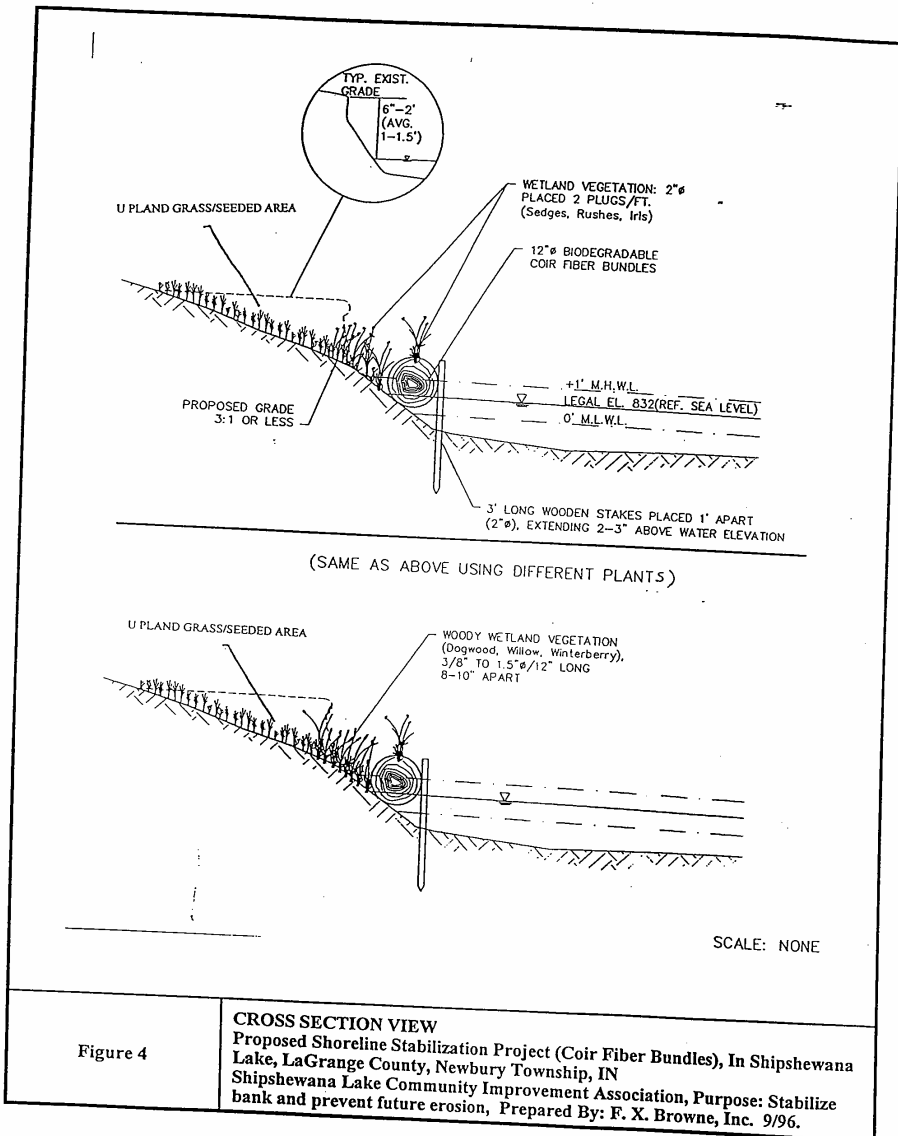
APPENDIX A

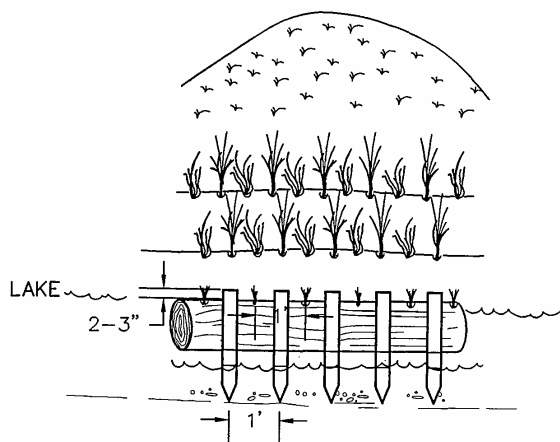
LOCATION MAPS
&
DESIGN FIGURES









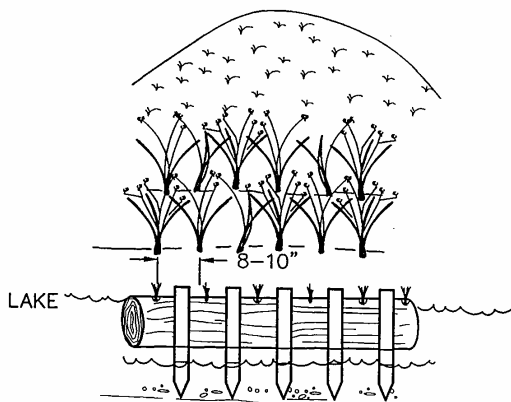


UPLAND GRASS SEED:
50lbs/ACRE MINIMUM
OR 1.1lbs/1000 sq. ft.
PLACE ON FERTILIZED SOIL AND
COVERED WITH STRAW MULCH

GRASSY WETLAND VEGETATION:
2"Ø PLACED 6" APART (SEDGES,
RUSHES, IRIS), AND STAGGERED

12" COIR FIBER BUNDLES:
GRASSY WETLAND VEGETATION
2"Ø PLACED 2 PLUGS/FT.

3' LONG WOODEN STAKES:
PLACED 1' APART (2"Ø)
EXTENDING 2-3" ABOVE
WATER ELEVATION



UPLAND GRASS SEED:
SAME AS ABOVE

WOODY WETLAND PLANTS:
3/8"-1/5"Ø, 12" LONG (DOGWOOD,
WINTERBERRY, WILLOW), PLACED
8-10" APART

12"Ø COIR FIBER BUNDLES:
AS ABOVE

3' LONG WOODEN STAKES:
AS ABOVE

FIGURE 5

FRONT VIEW OF PLANTING PLAN

APPENDIX B

PROJECT SITE PHOTOS



Photo 1- Erosion on Western Shore: Illustrating the large pieces of muck falling directly into Shipshewana Lake.

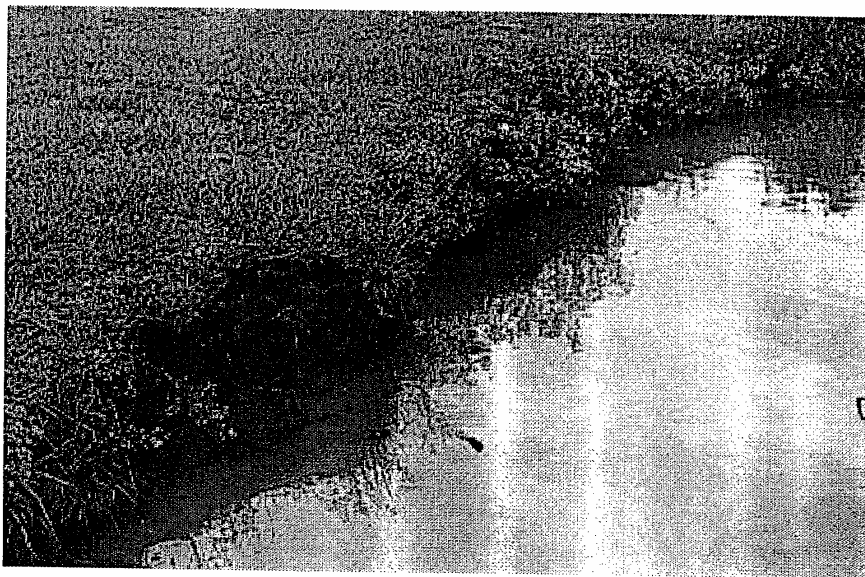


Photo 2- Illustrating eutrophic lake conditions as indicated by green color of lake water.

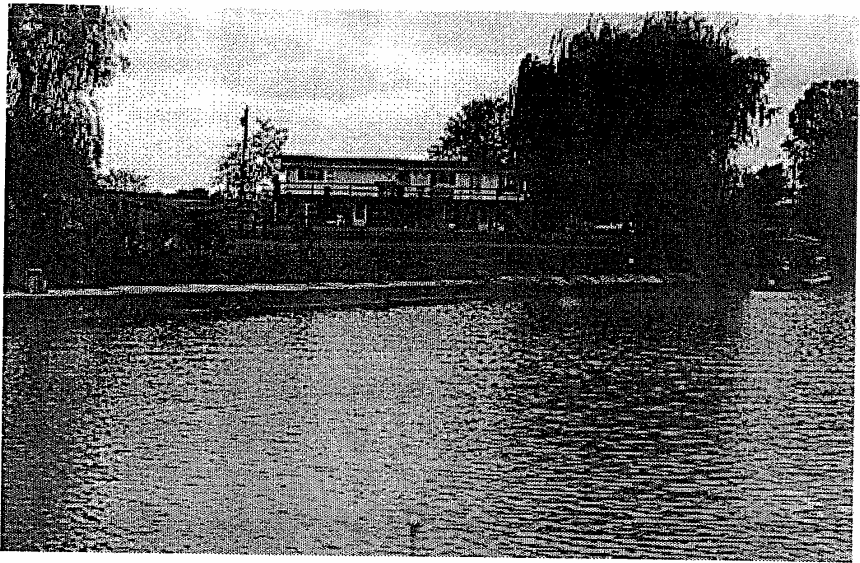


Photo 3- Several residents have constructed bulkheads, which are failing after a few years due to unstable soil conditions.

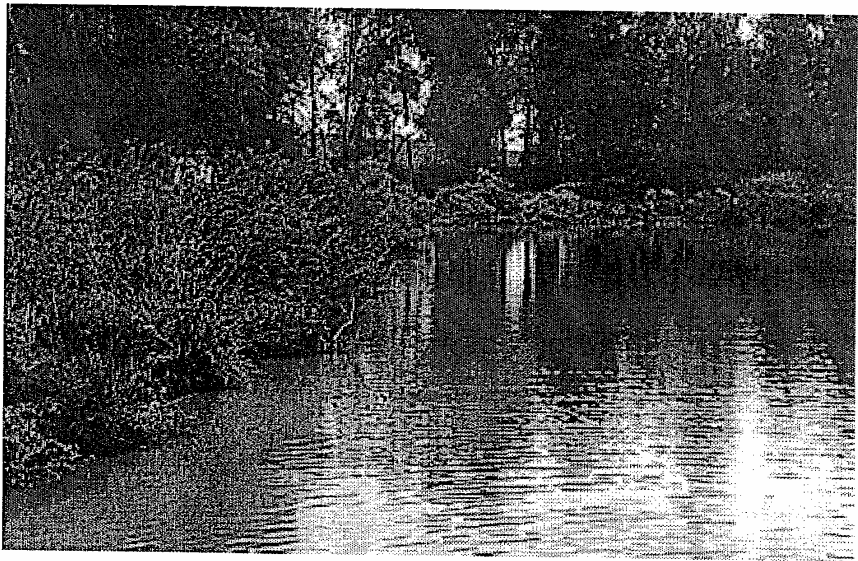


Photo 4- Illustrative of eutrophic lake conditions.

APPENDIX C

BIDDING PACKAGE
FOR
WETLAND PLANT MATERIALS



F. X. Browne, Inc.

Engineers • Planners • Scientists

January 30, 1997

Mr. Mike Martin, Association President
Shipshewana Lake Community Improvement Association
3485 North 98 West
Shipshewana, Indiana 46565

RE: Shoreline Stabilization, Plant Bidding
FXB File No. IN1337-02

Dear Mike:

In response to your request for bidding assistance, I have prepared the enclosed bidding package. You will probably want to start the process by printing the attached bidding notice. The potential clients will then call you for the bidding package, which is also enclosed.

Please let me know if you feel any additional information is needed or if you have any questions.

Sincerely,

F. X. BROWNE, INC.

By:
Suzanne Forbes

/sf

Enclosure

PUBLIC NOTICE

To Potential Bidders:

Notice is hereby given to area-wide nursery and plant suppliers that wetland plants are needed for a shoreline stabilization project to take place on approximately 4,600 linear feet of Lake Shipshewana Shoreline. Wetland plant material must be available for pick up by area landowners by the Spring of 1997. Sealed bids are due on March 1, 1997.

For more information and to request a bidding package, please contact:

Mr. Mike Martin, Association President, Shipshewana Lake Community Improvement Association, 3485 North 98 West, Shipshewana, Indiana 46565 (219) 768-4541.

Please call after 4:30 p.m. or leave a message stating the name of the business, contact person, address, & phone number.

TO: Potential Wetland Plant Suppliers

FROM: Mike Martin, Association President, Shipshewana Lake Community Improvement Association

RE: Plant Cost Estimate, Shipshewana Lake Shoreline Stabilization Project

DATE: February 1997

The following information will help you to complete a cost estimate for the Lake Shipshewana Shoreline Stabilization Project. The General Project Information Section provided below includes background information on the Lake Shipshewana shoreline stabilization project.

Several additional requirements should be noted:

- Plant material should be excellent condition and guaranteed for at least one growing season from the time they are planted.
- All plant material should be deliverable to the project site by the end of April 1997.
- Printed information (100 copies) regarding on-site plant care is required, and should be provided to the Association President by mid April.

GENERAL PROJECT INFORMATION

Lake Shipshewana is located in LaGrange County, Indiana (see attached map). Since the late 1970's, the water quality and general condition of Shipshewana Lake has declined dramatically. Pollution problems include sedimentation, and very high levels of nutrients. The Shipshewana Lake Community Association is addressing those problems through the implementation of several Best Management Practices (BMPs) within the lake and the surrounding watershed. This particular shoreline stabilization project is one such effort.

Shoreline stabilization will be accomplished through bioengineering techniques. The chosen technique involves the use of a natural substrate called *coir fiber bundles* in combination with appropriate wetland vegetation. The coir fiber will provide temporary stabilization (approximately 3 years), until the vegetation develops a fully-established root system to assume erosion control.

Shoreline stabilization will be implemented in two areas. The western shoreline of Lake Shipshewana (see attached map and tax parcel illustrations) involves the stabilization of approximately 3,800 linear feet of eroded shoreline. The northeastern shoreline of Lake Shipshewana involves the stabilization of approximately 800 linear feet of eroded shoreline. The chosen vegetation includes upland grasses (seed), grassy wetland vegetation and woody plant material. One-third of the landowners will be combining upland grasses (seed), woody wetland vegetation, and grassy wetland vegetation. The remaining landowners will be combining upland grasses (seed), and grassy wetland vegetation (see attached front and side views).

The coir fiber bundles will be installed by the Lake Improvement Association and their selected contractor during the spring of 1997. In addition, the following information may be helpful, and is based on project site dimensions for both the western shoreline and northeastern shoreline:

- Approximately 4,600 linear feet of eroded shoreline (private property) will be stabilized.
- The width of the eroded shoreline area is approximately 5 feet.
- Of that area, upland grass seed, fertilizer and straw mulch will be planted up slope in an area approximately 4,600' x 1.5'.
- The middle portion of the slope will contain grassy wetland plants for 2/3 of the landowners. This area will be approximately 3,066' x 3' with plantings at a rate of 2 plants per foot.
- The remainder of the middle portion of the slope will contain woody wetland plants for 1/3 of the landowners. This area will be approximately 1,534' x 3', and will be planted at a rate of 1 plant per 10".
- Grassy wetland plants will be planted in an area of approximately 4,600' x 1' within the coir fiber bundles and at a rate of 2 plants per foot.

Using the above site and plant selection information, the following was determined:

- Approximately 10 pounds of upland seed mixture is needed for the upper portion of the slope.
- Approximately 9,500 grassy wetland plants are needed for the Coir Fiber portion.
- Approximately 18,160 grassy wetland plants are needed for the middle portion of the slope (2/3 of the landowners).
- Approximately 5,700 woody plants are needed for the middle portion of the slope (1/3 of the landowners).

PLANT MATERIAL SPECIFICATIONS & GUARANTEES

The nursery or plant supplier should provide plant material in excellent condition and well-adapted to the on-site conditions of the Lake Shipshewana area. The plants should be packaged, so that the plants are not damaged during transport. Written directions on plant species and plant care should be provided to the landowners when they pick up plant materials. Liability for plant material should be (at a minimum) confined to replacement of the same species or a refund of at least the original purchase price.

TIMING AND SUBMITTAL REQUIREMENTS

A bid form is attached. Please submit 5 copies of the bid form to Mike Martin, Association President, Shipshewana Lake Community Improvement Association, 3485 North 98 West, Shipshewana, Indiana 46565 by March 1, 1997. Please call Mr. Martin at (219) 768-4541 if you have any further questions or concerns (after 4:30 p.m. or leave a message).

SHIPSHEWANA LAKE SHORELINE STABILIZATION PROJECT BID FORM

Area of Shoreline to be Stabilized	Species Desired	Quantities	Unit Cost/Total Cost
Upper Portion of Bank	<p>Please provide a price estimate for the following seed type or similar seed mixture, and we will choose one (10 lbs):</p> <ul style="list-style-type: none"> * Tall Fescue * Orchard Grass * Kentucky Blue Grass 	<ul style="list-style-type: none"> * 10 pounds * 10 pounds * 10 pounds 	<div style="text-align: center;"> <div>_____ / _____</div> <div>_____ / _____</div> <div>_____ / _____</div> </div>
Middle Portion of Bank (Grassy Wetland Plants)	<p>Please provide a price estimate for the following species, and we will choose one (18,160 plants) or two (9,080 each):</p> <ul style="list-style-type: none"> * Blue Flag Iris (Iris versicolor) * Soft-stemmed Bulrush (Scirpus validus) * Frank's Sedge (Carex frankii) 	<ul style="list-style-type: none"> * 18,160 plants, 2" plugs * 18,160 plants, 2" plugs * 18,160 plants, 2" plugs 	<div style="text-align: center;"> <div>_____ / _____</div> <div>_____ / _____</div> <div>_____ / _____</div> </div>
Middle Portion of Bank (Woody Wetland Plants)	<p>Please provide a price estimate for the following species, and we will choose one (5, 700 plants):</p> <ul style="list-style-type: none"> * Red Osier Dogwood (Cornus sericea) * Willow species (Willow sp.) 	<ul style="list-style-type: none"> * 5,700 plants, 18-24" height * 5,700 plants, 18-24" height 	<div style="text-align: center;"> <div>_____ / _____</div> <div>_____ / _____</div> </div>

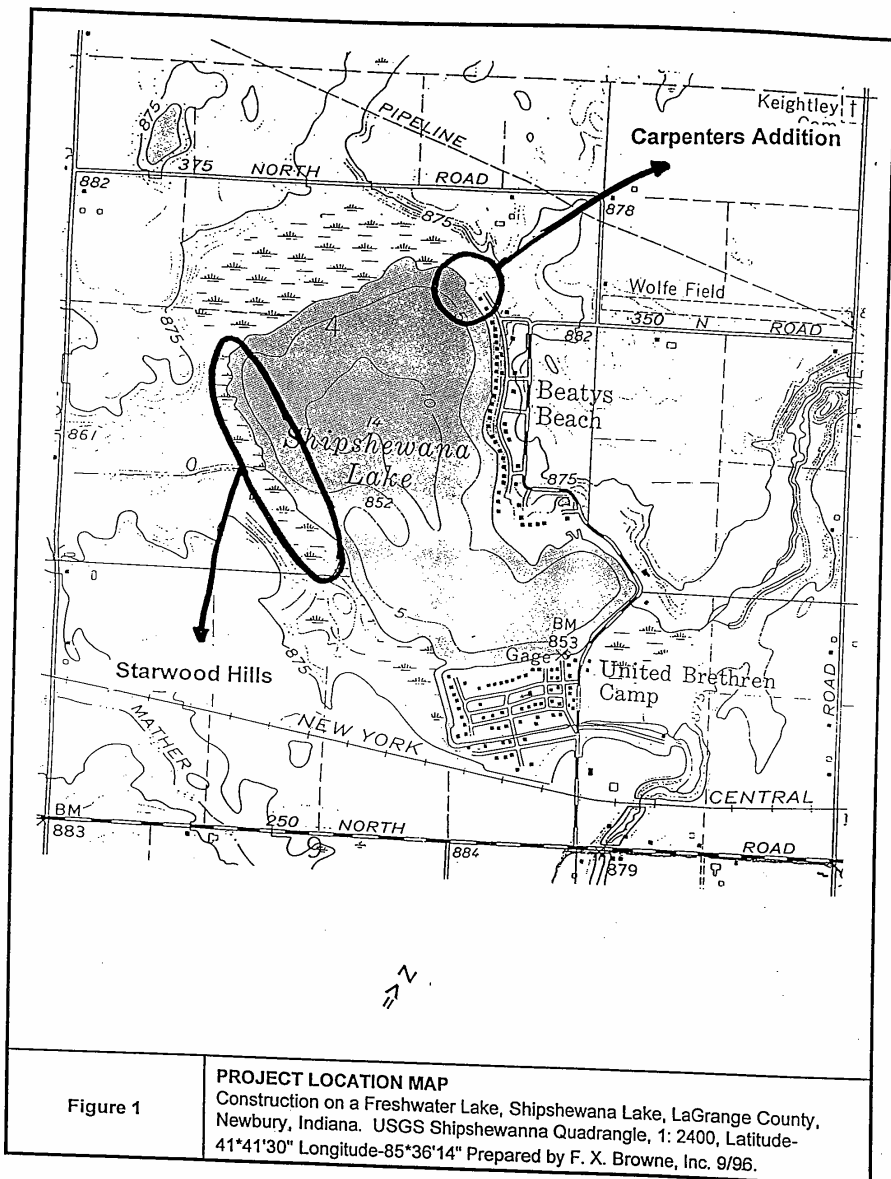
Area of Shoreline to be Stabilized	Species Desired	Quantities	Unit Cost/Total Cost
Within the Coir Fiber Bundles	Please provide a price estimate for the following species, and we will choose one (9,500 plants) or two (4,750 each).		
	* Soft Rush (<i>Juncus effusus</i>)	*9,500 plants, 2" plugs	____/____
	* Woolgrass (<i>Scirpus cyperinus</i>)	*9,500 plants, 2" plugs	____/____
	* Yellow Iris (<i>Iris pseudacorus</i>)	*9,500 plants, 2" plugs	____/____
TOTAL COST			\$ ____/____

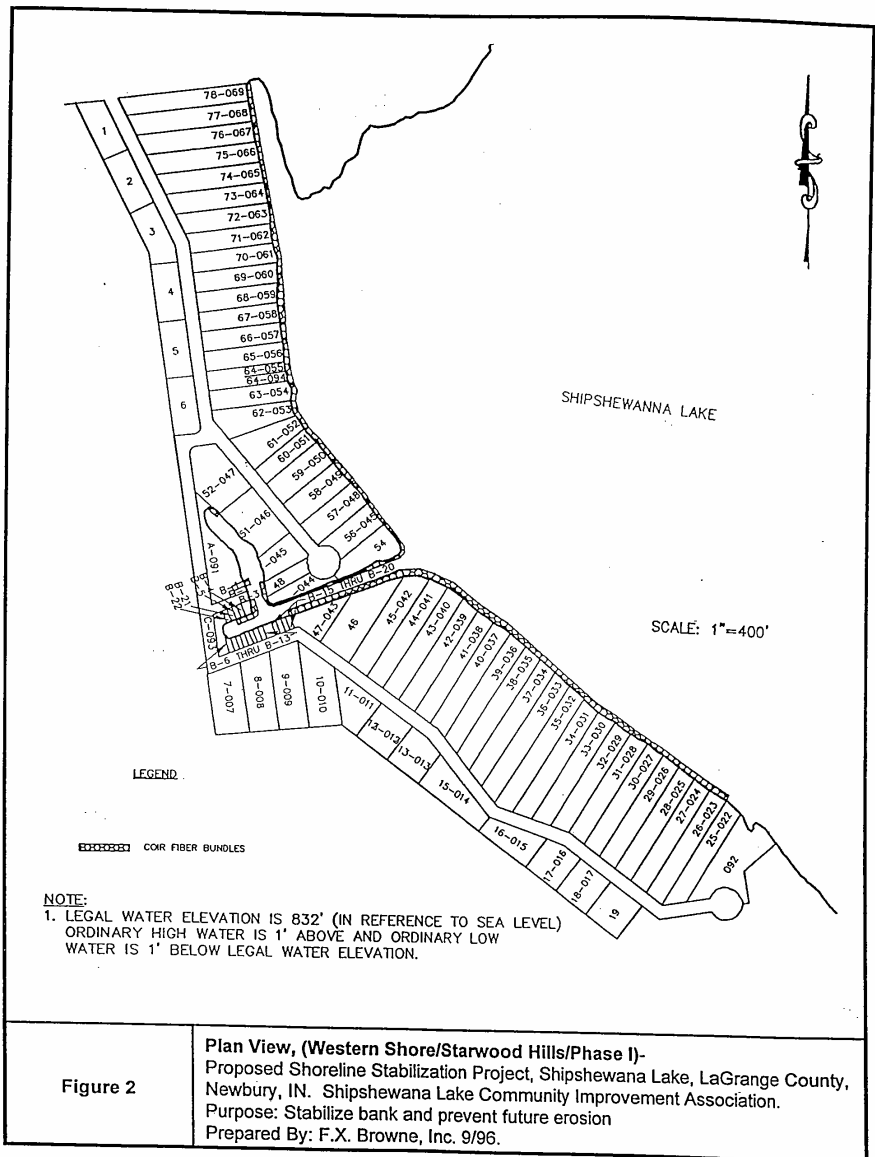
Submitted By: _____

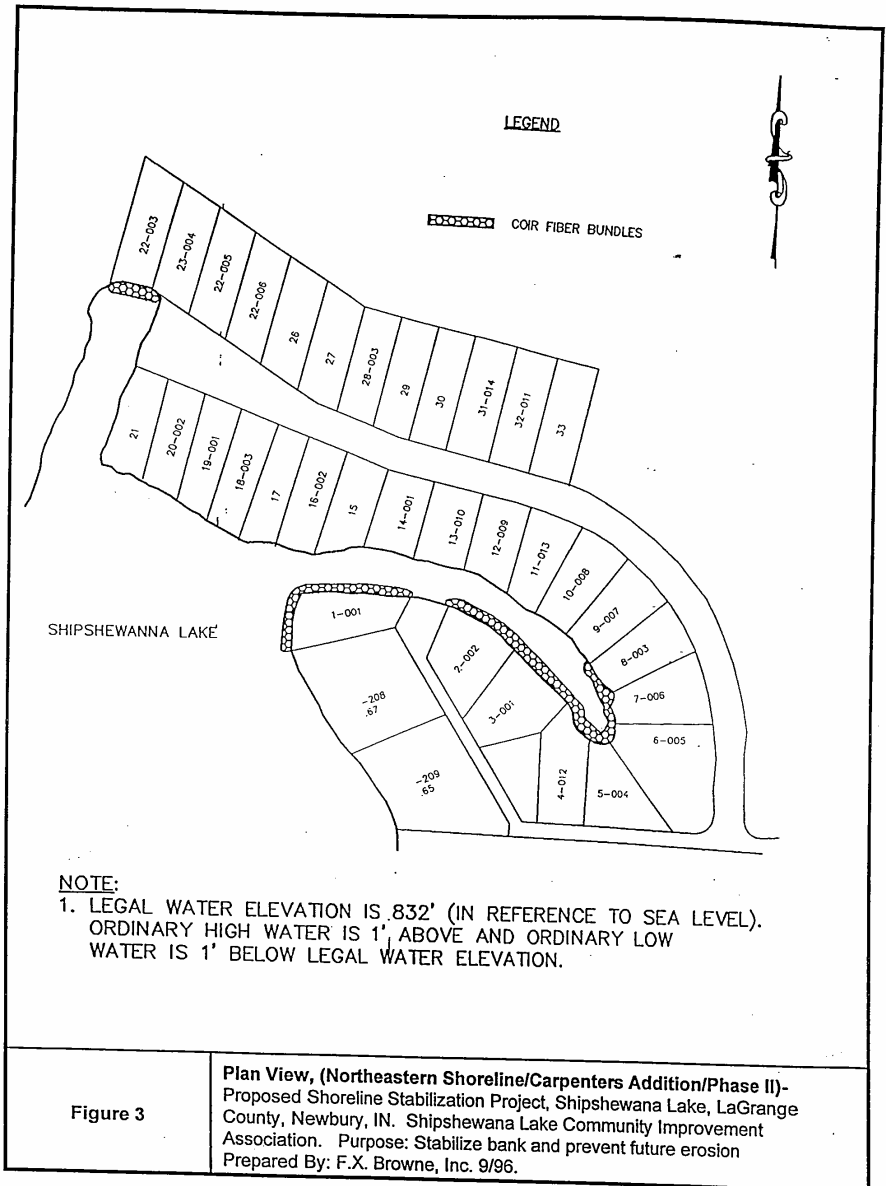
(Company Name, Address, & Phone Number)

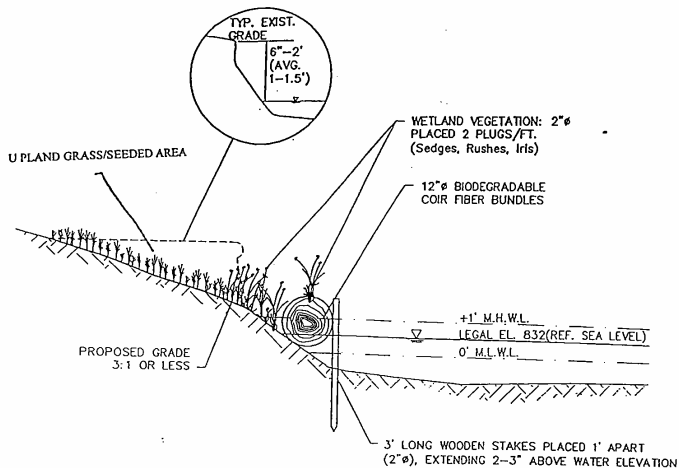
(Signature)

(Date)

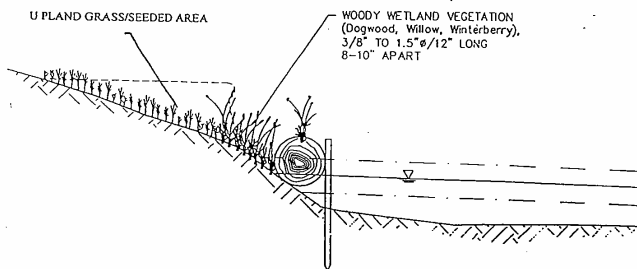








(SAME AS ABOVE USING DIFFERENT PLANTS)



SCALE: NONE

Figure 4

Cross Section View, (Coir Fiber Bundles)-
Proposed Shoreline Stabilization Project Shipshewana Lake, LaGrange
County, Newbury, IN. Shipshewana Lake Community Improvement
Association. Purpose: Stabilize bank and prevent future erosion
Prepared By: F.X. Browne, Inc. 9/96.

APPENDIX D

PERMIT APPLICATION INFORMATION
&
PERMIT APPROVAL INFORMATION



DEPARTMENT OF THE ARMY
DETROIT DISTRICT, CORPS OF ENGINEERS
REGULATORY BRANCH
SOUTH BEND FIELD OFFICE
6910 NORTH MAIN STREET UNIT 52
GRANGER, INDIANA 46530

DEC 23 1996
JN1337-02
SE

December 18, 1996

IN REPLY REFER TO

File No. 96-144-606-OGC

F.X. Browne, Inc.
Attn: Suzanne Forbes
P.O. Box 401
Lansdale, Pennsylvania 19446

Dear Ms. Forbes:

Reference the application you submitted on behalf of the Shipshewana Community Lake Improvement Association for a Department of the Army permit to stabilize 4,500 linear feet of shoreline. The project is located on Shipshewana Lake, Lagrange County, Indiana.

We have verified that the project is authorized by our regulations for nationwide permits under Title 33 CFR Part 330, Appendix A. The nationwide permit is a blanket permit whereby a class of activities having relatively minor impacts can receive Department of the Army authorization with a minimal amount of administrative review. The purpose of this letter is to inform you that your proposal has been evaluated, complies with, and is therefore authorized under the nationwide permit.

As indicated on the enclosed plans submitted on October 25, 1996, the following work is authorized:

Grade the existing eroding/failing bank to an approximate 3:1 slope along 4,500 linear feet of the shoreline. Coir fiber bundles shall be installed at the toe of the slope (bundles to be installed at an approximate elevation of 832 ft. Mean Sea Level). The exposed slope shall be planted with selected wetland vegetation.

This authorization is contingent upon compliance with the following terms and conditions:

1. NW13. Bank Stabilization. Bank stabilization activities necessary for erosion prevention provided:

a. No material is placed in excess of the minimum needed for erosion protection;

b. The bank stabilization activity is less than 500 feet in length;

c. The activity will not exceed an average of one cubic yard per running foot placed along the bank below the plane of the ordinary high water mark or the high tide line;

d. No material is placed in any special aquatic site, including wetlands;

e. No material is of the type or is placed in any location or in any manner so as to impair surface water flow into or out of any wetland area;

f. No material is placed in a manner that will be eroded by normal or expected high flows (properly anchored trees and treetops may be used in low energy areas); and,

g. The activity is part of a single and complete project.

h. Bank stabilization activities in excess of 500 feet in length or greater than an average of one cubic yard per running foot may be authorized if the permittee notifies the district engineer in accordance with the "Notification" general condition and the district engineer determines the activity complies with the other terms and conditions of the nationwide permit and the adverse environmental impacts are minimal both individually and cumulatively.

2. The enclosed general conditions.

3. The following special condition:

a. All excavation and/or grading activities necessary to achieve the desired bank slope shall be limited to the existing shoreline. No excavation and/or grading shall occur in areas of existing shallow water aquatic vegetation.

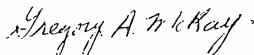
Any construction activity other than that shown on the plans may not qualify for the authorization. To our knowledge, your proposed activity complies. If that is not the case, you must contact this office for further instructions. If you contemplate any changes or additional activities from those depicted on the plans, please submit them to this office for authorization review prior to any construction.

This letter does not excuse you from the obligation to obtain any other Federal, state, and/or local authorization, if

required. You should not commence work until you receive the required authorizations. In addition, this nationwide permit does not grant any property rights or exclusive privileges, or authorize any injury to the property or rights of others.

This verification is valid for 2 years from the date of this letter unless the Nationwide Permit is modified, suspended, or revoked. If you have any questions on this matter, contact me at (219) 277-6044 and refer to File Number: 96-144-606-OGC.

Sincerely,



Gregory A. McKay
Biologist
South Bend Field Office

Enclosures

Copy Furnished

Michael Martin, Shipshewana Community Lake Improvement Assoc.

NATIONWIDE PERMIT GENERAL CONDITIONS

The following general conditions must be followed in order for any authorization by a nationwide permit to be valid:

1. Navigation. No activity may cause more than a minimal adverse effect on navigation.

2. Proper maintenance. Any structure or fill authorized shall be properly maintained, including maintenance to ensure public safety.

3. Erosion and siltation controls. Appropriate erosion and siltation controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills must be permanently stabilized at the earliest practicable date.

4. Aquatic life movements. No activity may substantially disrupt the movement of those species of aquatic life indigenous to the waterbody, including those species which normally migrate through the area, unless the activity's primary purpose is to impound water.

5. Equipment. Heavy equipment working in wetlands must be placed on mats or other measures must be taken to minimize soil disturbance.

6. Regional and case-by-case conditions. The activity must comply with any regional conditions which may have been added by the division engineer (see 33 CFR 330.4(e)) and any case specific conditions added by the Corps.

7. Wild and Scenic Rivers. No activity may occur in a component of the National Wild and Scenic River System; or in a river officially designated by Congress as a "study river" for possible inclusion in the system, while the river is in an official study status. Information on Wild and Scenic Rivers may be obtained from the National Park Service and the U.S. Forest Service.

8. Tribal rights. No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

9. Water quality certification. In certain states, an individual state water quality certification must be obtained or waived (see 33 CFR 330.4(c)).

10. Coastal zone management. In certain states, an individual state coastal zone management consistency concurrence must be obtained or waived. (see 33 CFR 330.4(d)).

11. Endangered Species. No activity is authorized under any NWP which is likely to jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act, or which is likely to destroy or adversely modify the critical habitat of such species. Non-federal permittees shall notify the district engineer if any listed species or critical habitat might be affected or is in the vicinity of the project and shall not begin work on the activity until notified by the district engineer that the requirements of the Endangered Species Act have been satisfied and that the activity is authorized. Information on the location of threatened and endangered species and their critical habitat can be obtained from the U.S. Fish and Wildlife Service and National Marine Fisheries Service. (see 33 CFR 330.4(f))

12. Historic properties. No activity which may affect historic properties listed, or eligible for listing, in the National Register of Historic Places is authorized, until the DE has complied with the provisions of 33 CFR 325, Appendix C. The prospective permittee must notify the district engineer if the authorized activity may affect any historic properties listed, determined to be eligible, or which the prospective permittee has reason to believe may be eligible for listing on the National Register of Historic Places, and shall not begin the activity until notified by the District Engineer that the requirements of the National Historic Preservation Act have been satisfied and that the activity is authorized. Information on the location and existence of historic resources can be obtained from the State Historic Preservation Office and the National Register of Historic Places (see 33 CFR 330.4(g)).

13. Notification. (a) Where required by the terms of the NWP, the prospective permittee must notify the District Engineer as early as possible and shall not begin the activity:

(1) Until notified by the District Engineer that the activity may proceed under the NWP with any special conditions imposed by the district or division engineer; or

(2) If notified by the District or Division engineer that an individual permit is required; or

(3) Unless 30 days have passed from the District Engineer's receipt of the notification and the prospective permittee has not received notice from the District or Division Engineer. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

(b) The notification must be in writing and include the following information and any required fees:

(1) Name, address and telephone number of the prospective permittee;

(2) Location of the proposed project;

(3) Brief description of the proposed project; the project's purpose; direct and indirect adverse environmental effects the project would cause; any other NWP(s), regional general permit(s) or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity;

(4) Where required by the terms of the NWP, a delineation of affected special aquatic sites, including wetlands; and

(5) A statement that the prospective permittee has contacted:

(i) The USFWS/NMFS regarding the presence of any Federally listed (or proposed for listing) endangered or threatened species or critical habitat in the permit area that may be affected by the proposed project; and any available information provided by those agencies. (The prospective permittee may contact Corps District Offices for USFWS/NMFS agency contacts and lists of critical habitat.)

(ii) The SHPO regarding the presence of any historic properties in the permit area that may be affected by the proposed project; and the available information, if any, provided by that agency.

(c) The standard individual permit application form (Form ENG 4345) may be used as the notification but must clearly indicate that it is a PDN and must include all of the information required in (b)(1)-(5) of General Condition 13.

(d) In reviewing an activity under the notification procedure, the District Engineer will first determine whether the activity will result in more than minimal individual or cumulative adverse environmental effects or will be contrary to the public interest. The prospective permittee may, at his option,

submit a proposed mitigation plan with the predischarge notification to expedite the process and the District Engineer will consider any optional mitigation the applicant has included in the proposal in determining whether the net adverse environmental effects of the proposed work are minimal. The District Engineer will consider any comments from Federal and State agencies concerning the proposed activity's compliance with the terms and conditions of the nationwide permits and the need for mitigation to reduce the project's adverse environmental effects to a minimal level. The district engineer will upon receipt of a notification provide immediately (e.g. facsimile transmission, overnight mail or other expeditious manner) a copy to the appropriate offices of the Fish and Wildlife Service, State natural resource or water quality agency, EPA, and, if appropriate, the National Marine Fisheries Service. With the exception of NWP 37, these agencies will then have 5 calendar days from the date the material is transmitted to telephone the District Engineer if they intend to provide substantive, site-specific comments. If so contacted by an agency, the District Engineer will wait an additional 10 calendar days before making a decision on the notification. The District Engineer will fully consider agency comments received within the specified time frame, but will provide no response to the resource agency. The District Engineer will indicate in the administrative record associated with each notification that the resource agencies' concerns were considered. Applicants are encouraged to provide the Corps multiple copies of notifications to expedite agency notification. If the District Engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse effects are minimal, he will notify the permittee and include any conditions he deems necessary. If the District Engineer determines that the adverse effects of the proposed work are more than minimal, then he will notify the applicant either: (1) that the project does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit; or (2) that the project is authorized under the nationwide permit subject to the applicant's submitting a mitigation proposal that would reduce the adverse effects to the minimal level. This mitigation proposal must be approved by the District Engineer prior to commencing work. If the prospective permittee elects to submit a mitigation plan, the DE will expeditiously review the proposed mitigation plan, but will not commence a second 30-day notification procedure. If the net adverse effects of the project (with the mitigation proposal) are determined by the District Engineer to be minimal, the District Engineer will provide a timely written response to the applicant informing him that the project can proceed under the terms and conditions of the nationwide permit.

(c) Wetlands Delineations: Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic site. There may be some delay if the Corps does the delineation. Furthermore, the 30-day period will not start until the wetland delineation has been completed.

(f) Mitigation: Factors that the District Engineer will consider when determining the acceptability of appropriate and practicable mitigation include, but are not limited to:

(1) To be practicable the mitigation must be available and capable of being done considering costs, existing technology, and logistics in light of overall project purposes;

(2) To the extent appropriate, permittees should consider mitigation banking and other forms of mitigation including contributions to wetland trust funds, which contribute to the restoration, creation, replacement, enhancement, or preservation of wetlands.

Furthermore, examples of mitigation that may be appropriate and practicable include but are not limited to: reducing the size of the project; establishing buffer zones to protect aquatic resource values; and replacing the loss of aquatic resource values by creating, restoring, and enhancing similar functions and values. In addition, mitigation must address impacts and cannot be used to offset the acreage of wetland losses that would occur in order to meet the acreage limits of some of the nationwide permits (e.g. 5 acres of wetlands cannot be created to change a 6 acre loss of wetlands to a 1 acre loss; however, the 5 created acres can be used to reduce the impacts of the 6 acre loss).

SECTION 404 ONLY CONDITIONS: In addition to the General Conditions, the following conditions apply only to activities that involve the discharge of dredged or fill material and must be followed in order for authorization by the nationwide permits to be valid:

1. Water supply intakes. No discharge of dredged or fill material may occur in the proximity of a public water supply intake except where the discharge is for repair of the public water supply intake structures or adjacent bank stabilization.

2. Shellfish production. No discharge of dredged or fill material may occur in areas of concentrated shellfish production, unless the discharge is directly related to a shellfish harvesting activity authorized by nationwide permit 4.

3. Suitable material. No discharge of dredged or fill material may consist of unsuitable material (e.g., trash, debris, car bodies, etc.) and material discharged must be free from toxic pollutants in toxic amounts (see section 307 of the Clean Water Act).

4. Mitigation. Discharges of dredged or fill material into waters of the United States must be minimized or avoided to the maximum extent practicable at the project site (i.e. on-site), unless the DE has approved a compensation mitigation plan for the specific regulated activity.

5. Spawning areas. Discharges in spawning areas during spawning seasons must be avoided to the maximum extent practicable.

6. Obstruction of high flows. To the maximum extent practicable, discharges must not permanently restrict or impede the passage of normal or expected high flows or cause the relocation of the water (unless the primary purpose of the fill is to impound waters).

7. Adverse impacts from impoundments. If the discharge creates an impoundment of water, adverse impacts on the aquatic system caused by the accelerated passage of water and/or the restriction of its flow shall be minimized to the maximum extent practicable.

8. Waterfowl breeding areas. Discharges into breeding areas for migratory waterfowl must be avoided to the maximum extent practicable.

9. Removal of temporary fills. Any temporary fills must be removed in their entirety and the affected areas returned to their preexisting elevation.



INDIANA DEPARTMENT OF NATURAL RESOURCES

PATRICK R. RALSTON, DIRECTOR

Division of Historic Preservation
and Archaeology
402 W. Washington St., Rm. 274
Indianapolis, Indiana 46204
317-232-1646

January 30, 1997

Suzanne Forbes
F.X. Browne, Inc.
Post Office Box 401
Lausdale, Pennsylvania 19446

Dear Ms. Forbes:

We have reviewed the proposed stabilization of the western and northeastern shores of Shipshewana Lake, dredging of the lake and disposal of sediment, and the creation of wetlands northwest of Shipshewana in LaGrange County, Indiana.

As long as no structures will be demolished or removed, no known historical or architectural sites listed in or eligible for inclusion in the National Register of Historic Places will be affected by this project.

In light of the new information received by our office in the telephone conversation between Suzanne Forbes of F.X. Browne, Inc. and Sandra Walters of DHPA on January 3, 1997, all archaeological concerns have been addressed. Therefore, as long as the project remains within areas disturbed by previous construction no known archaeological sites listed in or eligible for inclusion in the National Register of Historic Places will be affected by this project.

However, if any archaeological artifacts or human remains are uncovered during construction, federal law and regulations (16 USC 470, et seq.; 36 CFR 800.11, et al.) and, additionally, state law (Indiana Code 14-21-1), require that work must stop and that the discovery must be reported to the Division of Historic Preservation and Archaeology within two (2) business days. Thank you for your cooperation.

If you have any further questions regarding the archaeological aspects of this project, please call Jim Mohow at (317) 232-1646. Thank you for your cooperation.

Very truly yours,

A handwritten signature in dark ink, appearing to read "Patrick R. Ralston". The signature is stylized with a large, looped "P" and a long, sweeping "R".
Patrick R. Ralston
State Historic Preservation Officer

PRR:SLW:MMD:smg

ADMINISTRATIVELY COMPLETE NOTICE

Permit Administration Section
Division of Water
Room W264
402 West Washington Street
Indianapolis IN 46204

Notice Date: December 31, 1996

Telephone #: (317) 233-5635
FAX # : (317) 233-4579

JAN - 8 1997
JN1337-02
SF

Application #: PL-17,260

Type: Public freshwater lake

Lake: Shipshewana Lake

Applicant:

Shipshewana Community Lake
Improvement Association
Mike Martin, President
3485 North 98 West
Shipshewana IN 46565

Agent:

F.X. Browne, Inc.
P.O. Box 401
Lansdale PA 19446

Dear Applicant:

On December 9, 1996, the Division of Water received your permit application under the Lakes Preservation Act, IC 14-26-2, with the associated Public Freshwater Lake Rule, 310 IAC 6-2, for the project described on the next page. Based on staff's preliminary review, your application has been deemed administratively complete. Further review of your application will be performed by Department staff to determine if additional technical or environmental information is required. If so, you will be notified by mail at a later date. A receipt for your application fee is enclosed.

If you have any questions regarding the status of your application, please contact the appropriate staff member at the address shown above or at one of the following telephone numbers. Refer to application # PL-17,260 in all correspondence with the Department.

<u>Responsibility</u>	<u>Staff</u>	<u>Telephone and FAX #</u>
Administrative	Markita L. Shepherdson	(317) 233-5635, 233-4579
Technical	Anthony D. Foreman	(317) 232-4161, 233-4579

In addition to a permit from the Department of Natural Resources, you may also be required to obtain a permit from, or coordinate with, the following agencies. Contact with these agencies is your responsibility.

<u>Agency</u>	<u>Telephone #</u>
Detroit District, U.S. Army Corps of Engineers	(313) 226-2218
Indiana Department of Environmental Management	(317) 233-2471
Local city or county planning or zoning commission	

Be advised that this notice is not a permit nor an authorization to proceed with the project. It should not be construed as a waiver of the provisions or requirements of any other state, federal, or local regulatory activity.

pc: F.X. Browne, Inc.

Proof of Publication

PUBLIC NOTICE

TO ALL CONCERNED:

Indiana Code 14-11-4 was enacted to ensure that all property owners are notified of permit applications and provided with an opportunity to present their views to the Department of Natural Resources prior to action.

APPLICANT: Shipshewana Community Lake Improvement Association.

LAKE NAME: Shipshewana Lake

RELEVANT STATUTE: Lake Preservation Act, ICX 14-26-2

PROJECT DESCRIPTION/

LOCATION: Erosion of the lake shoreline is a problem, which results in loss of soil and subsequent water quality problems. To manage this environmental problem, portions of the western and northeastern shoreline will be stabilized to prevent further erosion. Stabilization will be accomplished through bio-engineering techniques. Coir fiber bundles, a natural substrate, will be used in combination with select wetland vegetative species. The fiber provides temporary stabilization until the vegetation becomes established with fully developed root systems to assume erosion control.

QUESTIONS RELATED TO THE PROJECT:

FX, Browne, Inc.
Suzanne Forbes
P.O. Box 401
Lansdale, PA 19446
(215) 362-3878

REQUESTS FOR HEARINGS: You may request an informal public hearing, pre-AOPA (Administrative Orders and Procedures Act) hearing on this application by filing a petition with the Division of Water. The petition must conform to administrative rule 310 IAC 0.6 as follows: (a) This section establishes the requirements for a petition to request a public hearing under IC 14-11-4-8 (a)(2). (b) The petition shall include the signatures of at least twenty-five (25) individuals who are at least eighteen (18) years of age and who reside in the county where the licensed activity would take place or who own real property within one (1) mile of the site of the proposed or existing licensed activity. (c) The complete mailing addresses of the petitioners shall be typed or printed legibly on the petition. (d) Each individual who signs the petition shall affirm that the individual qualifies under subsection (b).

A pre-AOPA public hearing on the application will be limited to the Department's authority under the permitting statutes. Only the issues relevant to the Department's jurisdiction directly related to this application for construction will be addressed. Under permitting statutes, the Department has no authority in zoning, local drainage, burning, traffic safety, etc.; therefore, topics beyond the Department's jurisdiction will not be discussed during the public hearing. You may also request that the Department notify you in writing when an initial determination is made to issue or deny the permit. Following the receipt of the post action notice, you may request administrative review of the determination by the Natural Resources Commission under IC 14-21.5 and 310 IAC 0.6.

REQUEST FOR HEARING:

Permit Administration Section
Division of Water
Department of Natural Resources
402 West Washington St., Rm. W264
Indianapolis, Indiana 46204-2748
Telephone: (317) 233-6635

STATE OF INDIANA, } ss:
Elkhart County, }

I, Pam Sheets being duly sworn, on oath say that I am Business Office Manager of THE GOSHEN NEWS, that the same is a Daily newspaper of general circulation, printed and published in the City of Goshen, in the County and State of aforesaid; that the annexed true copy was published in said newspaper one

consecutive weeks as follows:

On the 27th day of November, 19 96

On the _____ day of _____, 19 _____

On the _____ day of _____, 19 _____

On the _____ day of _____, 19 _____

Pam H. Sheets

Subscribed and sworn before me this 27th day

of November, 19 96

Janice C. Zigich
Janice C. Zigich Notary Public.

Publication Fee \$84.67

My commission expires June 17, 2000



F. X. Browne, Inc.

Engineers • Planners • Scientists

April 2, 1997

Ms. Anne Burget, Rule Five Coordinator
Indiana Department of Environmental Management
Office of Water Management
Permits Section, Stormwater Desk
100 North Senate Avenue
P.O. Box 6015
Indianapolis, IN 46206-6015

RE: Shipshewana Lake Shoreline Stabilization Project
FXB File No. IN1337-02

Dear Ms. Burget :

The enclosed Notice of Intent (NOI) letter and attachments are provided to comply with the requirements of Rule 5 (327 IAC 15-5), Stormwater Runoff Associated with Construction Activity. The NOI pertains to a shoreline stabilization project to take place on Shipshewana Lake in LaGrange County, Indiana. The project is intended to control erosion and sedimentation on approximately 4,600 linear feet of denuded and eroded lake shoreline. Therefore, it is expected to improve the quality of Shipshewana Lake.

In addition, a minimal amount of stormwater runoff is expected to result from the excavation required to stabilize the shoreline with coir fiber bundles and the planting of wetland vegetation. In fact, this project will effectively reduce the amount of stormwater arriving at Lake Shipshewana from a previously denuded shoreline.

In order to comply with the Rule 5 requirements, the following are enclosed:

- State Form 47487, Indiana Department of Environmental Management Notice of Intent (NOI).
- Proof of Public Notice, A signed Certification Statement [327 IAC 15-4-3 (g)], and a check for \$100.00.
- Illustrations are attached to clarify location, acreage, acreage to be "disturbed" (excavated) and shoreline stabilization approach.

F. X. BROWNE, INC.

Ms. Anne Burget, Rule Five Coordinator

April 2, 1997

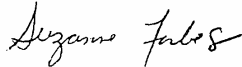
Page -2-

In addition, a soil and erosion plan has been submitted to Mark Diehm of the LaGrange County Soil and Water Conservation District. That plan was submitted on April 2, 1997, but was successfully reviewed as a pre-design in October of 1996.

Please let me know if you have any additional questions or concerns regarding this submittal. We will notify IDEM upon completion of the project.

Sincerely,

F. X. BROWNE, INC.

A handwritten signature in cursive script, appearing to read "Suzanne Forbes".

By:

Suzanne Forbes

/sf

cc: David Leffarge, IDNR, Division of Soil Conservation
Greg McCay, Army Corps of Engineers
Michael Massone, IDNR, Clean Lakes Program
Scott McClarney, IDNR, Division of Water
Mike Martin, Shipshewana Lake Community Improvement Association (w/enc)
Rex Pranger, LaGrange County Drainage Board & County Surveyor



Indiana Department of Environmental Management
Notice of Intent (NOI)
Storm Water Runoff Associated with Construction Activity
NPDES General Permit Rule 327 IAC 15-5 (Rule 5)

Submission of this Notice of Intent letter constitutes notice that the operator is applying for coverage under the National Pollutant Discharge Elimination System (NPDES) General Permit Rule for Storm Water Discharges Associated with Construction Activity (see 327 IAC 15-2-5 (c) for definition of operator). Permitted operators are required to comply with all terms and conditions of the General Permit Rule 327 IAC 15-5 (Rule 5).

Construction Project:

Name: Shipshewana Shoreline Stabilization County: LaGrange

SIC Code or Description of Project: Coir fiber bundle & wetland vegetation approach
Location: Shipshewana Lake, western and northeastern shoreline

Operator Name: Mike Martin, Association President Phone: 219/768-4541

Company Name: Shipshewana Lake Community Improvement Association

Complete Address: 3485 North 980 West, Shipshewana, IN 46565

Contact Person (if different from above): Suzanne Forbes, F. X. Browne, Inc.

Complete Address (if different from above): 1101 South Broad Street, P.O. Box 401
Lansdale, PA 19446 Phone: 215/362-3878

Affiliation with operator: Consulting Firm

Ownership Status: (check one) Federal ☐ State ☐ Public (other than Federal or State) ☐
Private ☒ Other ☐

Location: Latitude & Longitude 41° 41' 30" / 85° 36' 14" Or Quarter NE/SW Section 4T
Township 37 N/S Range 8E

Name of Receiving Water (and if applicable, name of municipal operator of storm sewer):
Shipshewana Lake

Please note: Even if a retention pond is present on the property, the name of the nearest possible receiving water is required.

Acres: Total acreage: .53* Acreage to be Disturbed: .53**

Timetable: Start Date: 4/97 Estimated End Date: 6/97

Please note: The operator is responsible for all construction activities within the boundaries of the project until all construction is complete. If individual lots are to be sold within a subdivision or commercial park, the operator should consider developing contractual agreements to bind lot buyers and builders to compliance with the Soil Erosion Control Plan established by the operator, and to indemnify the operator for any violations. An example of a contractual clause of this nature may be obtained by contacting IDEM, Office of Water Management, Rule 5 Desk at 317/ 232-8760.

State Form 47487 (1-96)

(Continued on Reverse Side)

*4,600 linear feet, 5 feet wide = 23,000 square feet

**See Figure 6

Exclusions From Coverage Under the General Permit:

1. Storm water discharges excluded by any provision of 327 IAC 15-2-3
2. Storm water discharges to an outstanding state resource water as listed in 327 IAC 2-1-2(3) or to an exceptional use resource water defined in 327 IAC 2-1-11(b)

Soil Erosion Control Plan Certification:

By signing this Notice of Intent letter, I, the operator, certify the following:

- A. The erosion control measures included in the Soil Erosion Control Plan comply with the requirements of 327 IAC 15-5-7 and 15-5-9 and the plan complies with applicable state, county, and local erosion control requirements;
- B. The erosion control measures will be implemented in accordance with the plan;
- C. The appropriate state, county, or local erosion control authority and the county Soil and Water Conservation District (SWCD) office have been sent a copy of the erosion control plan for review; and
- D. Implementation of the erosion control measures will be conducted by personnel trained in erosion control practices.

Operator Responsibility Statement:

By signing this Notice of Intent letter, I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature of Operator

Michael D. Martin

Date 3-28-97

In addition to this form, completed in full, please submit the following:

- ☒ proof of publication in a newspaper of general circulation in the affected area notifying the public that a construction activity is to commence, including the start date, end date, and location of the project, and the name and address or phone number of the contact person;
- ☒ \$100 check or money order payable to the Indiana Department of Environmental Management.

Mail to: Indiana Department of Environmental Management

Office of Water Management

100 North Senate Avenue, P.O. Box 6015

Indianapolis, IN 46206-6015

Attention: Permits Section, Storm Water Desk

Questions regarding Soil Erosion Control Plan development or implementation may be directed to your local SWCD or Department of Natural Resources office. Questions regarding the Notice of Intent may be directed to the Rule 5 contact person at 317/232-8760 or 800/451-6027. The NOI should be submitted only after your Soil Erosion Control Plan has been submitted to your local SWCD. Any person initiating earth disturbing activity before submittal of the Erosion Control Plan, the NOI, and the \$100 filing fee is considered to be operating without a permit and subject to enforcement and penalty under IC 13-7-10-5, IC 13-7-12, IC 13-7-11, or any combination thereof.

Certification Statement [327 IAC 15-4-3(g)]

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Michael D. Marts
Responsible Operator of Construction Project

3-28-97
Date

APPENDIX E

PLANTING PLAN
&
MAINTENANCE PLAN

PLANTING & MAINTENANCE PLAN
LAKE SHIPSEWANA SHORELINE STABILIZATION PROJECT



Submitted To:
The Shipshewana Lake Community
Improvement Association
Shipshewana, IN 46565

Submitted By:
F. X. Browne, Inc.
P. O. Box 401
Landsdale, PA 19446
(215) 362-3878

SHIPSHEWANA LAKE SHORELINE STABILIZATION PLANTING AND MAINTENANCE PLAN:

Wetland Plant Care

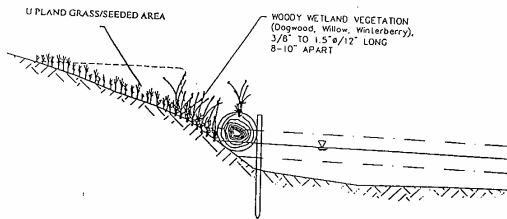
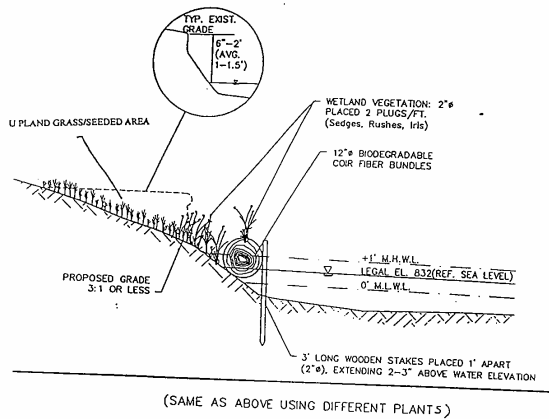
Your plants and upland seed mixture will be available at one location to be determined at a later date. Once the plants arrive at the site, you should avoid direct sunlight so that the plants do not become dried out. Make sure that they are irrigated every day, and just before they are planted. Store your seeds in a cool dry place until right before planting.

Stabilization Project Sequence

The following events will take place on each lot on the day the shoreline is stabilized:

1. Coir Fiber Bundles shall be placed according to specifications and along denuded and eroded areas.
 - a. Biodegradable coir fiber geotextile rolls with a diameter of 12 inches will be placed up against the bank. The upper surface of the roll shall be parallel to the water surface, with two inches protruding above mean water level. Adjustments shall be made as needed, using hand tools to seat the roll such that it lies smoothly at the correct elevation. Rolls shall be laced together end-to-end with nylon 1/8 inch diameter rope to create a continuous roll.
 - b. Three foot wooden stakes (2" diameter), shall be driven along the outside portion of the rolls (lakeside) one foot on center. The stakes shall extend 8-10" above the elevation of the lake.
2. Grading shall be accomplished in the following manner:
 - a. Unstable debris should be removed from areas to be reshaped and then stabilized. Care shall be taken to disturb as little soil as possible outside the work area, and to avoid damage to any existing trees and shrubs on or near the bank. Eroded shoreline will be regraded and result in 3:1-4:1 slope range.
3. Planting shall take place in the following manner:
 - a. Plants shall be watered immediately before planting. Planting will take place as each individual lot is graded.
 - b. Planting will proceed from the top to the bottom of the slope, and care will be taken to disturb as little of the graded area as possible.
4. Areas at the *top of the slope* will be seeded with upland grasses. The upland grass mixture should be planted in the following way:

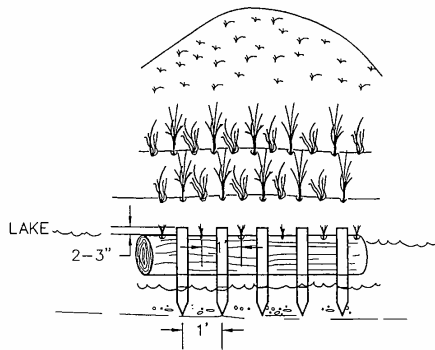
- a. **Rake the area:** Make sure the upland portion of the slope has been raked and is leveled out according to design. Leave area rough for optimum seed germination.
 - b. **Fertilize the area:** The Fertilizer will be provided by the Association. The Limestone will be 50% calcium plus magnesium oxides. Fertilizer should be uniformly spread, and raked into the soil before seeding. Apply by hand or by using applicator. Apply on the top portion of the slope up to the 3' wide area to be planted with grassy wetland vegetation and/or woody wetland vegetation.
 - c. **Seed the area:** The application rate for seeding shall be 50 lbs. per acre minimum or 1.1 lbs/1000 square feet.
 - d. **Mulch the area:** Uniformly spread straw mulching to protect newly seeded areas.
5. Plant grassy and/or woody wetland vegetation in a three-foot wide area below the seeded area and adjacent to the Coir Fiber Bundle material. Planting should take place as rapidly as possible to avoid plant desiccation. Care should be taken to use only the moist soil excavated to backfill the holes. Tamp backfill firmly to eliminate voids and to obtain contact between the root systems and the native soils. Leave a slight depression to collect rainfall. Plant the materials in the following way:
 - a. **Shrubby Vegetation:** The shrubby plant material will be container grown Red-Osier Dogwood, Willow, and/or Winterberry. It should be planted in a staggered manner to avoid straight rows. (See Figure 2). Dig a hole that is larger than the root system (approximately 1/3 the size of the plant). Gently remove the plant from container, place in the hole and cover with soil. The woody vegetation should be planted 8-10" apart.
 - b. **Grassy Wetland Vegetation (Adjacent to Coir Fiber Bundle):** The grassy wetland vegetation will be in plastic packs and will consist of Sedges, Rushes and/or Iris. They should be planted in the wet areas immediately adjacent to the coir fiber bundles. The planting holes should be large enough to cover the root systems (Approximately 1/3 the size of the plant). Gently remove the plant and soil from the packs. Place them in a staggered pattern 6" apart. Cover with soil.
 - c. **Grassy Wetland Vegetation (In Coir Fiber Bundle):** Two inch grassy wetland plants with soil shall be inserted into the coir fiber rolls and placed 6" apart. Avoid damaging sensitive roots by gently removing plant from plastic pack. Planting tools may be used to create a planting hole that is 1/3 the size of the plant. Cover with soil.



SCALE: NONE

Figure 1

Cross Sectional View of Coir Fiber Bundles and wetland vegetation for Shipshewana Lake Shoreline Stabilization Project.

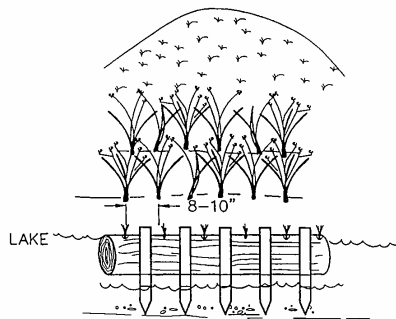


UPLAND GRASS SEED:
50lbs/ACRE MINIMUM
OR 1.1lbs/1000 sq. ft.
PLACE ON FERTILIZED SOIL AND
COVERED WITH STRAW MULCH

GRASSY WETLAND VEGETATION:
2"Ø PLACED 6" APART (SEDGES,
RUSHES, IRIS), AND STAGGERED

12" COIR FIBER BUNDLES:
GRASSY WETLAND VEGETATION
2"Ø PLACED 2 PLUGS/FT.

3' LONG WOODEN STAKES:
PLACED 1' APART (2"Ø)
EXTENDING 2-3" ABOVE
WATER ELEVATION



UPLAND GRASS SEED:
SAME AS ABOVE

WOODY WETLAND PLANTS:
3/8"-1 5/8"Ø, 12" LONG (DOGWOOD,
WINTERBERRY, WILLOW), PLACED
8-10" APART

12"Ø COIR FIBER BUNDLES:
AS ABOVE

3' LONG WOODEN STAKES:
AS ABOVE

Figure 2

Front View, Planting Plan,
Shipshewana Lake Shoreline Stabilization Project

Maintenance of Coir Fiber Bundles and Plant Materials

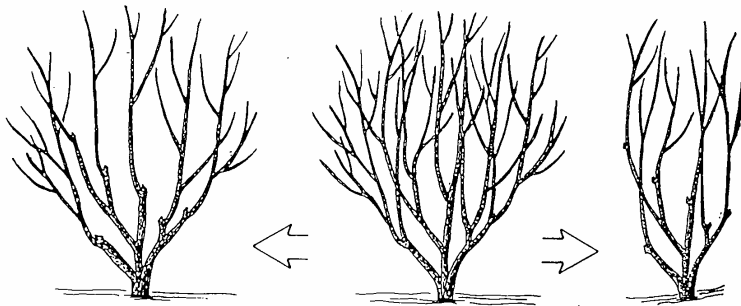
1. Maintenance of Coir Fiber Bundles should take place as needed. Wooden stakes can be removed once the plants are fully established or left in to biodegrade along with the Coir Fiber Bundles (Approximately 2-3 years).
2. The upland grasses should be watered daily for the first week. Mowing can take place as soon as the grass is well-established (approximately 3-6weeks). Be sure to mow the area when it is dry to avoid disturbing the area.
3. Shrubby plant materials should not need to be watered for a few days if they were thoroughly irrigated before planting, and a depression was made when planted. Check the plants daily to make sure they are not becoming dried out. Frequent watering may be required until new growth is witnessed (approximately 1-3 weeks).
4. The grassy wetland vegetation planted in the wet areas do not need maintenance. Check their growth periodically, and replant if they become dislodged.
5. Monitor the progress of plants and coir fiber material and be sure to report any problems if they occur.

PRUNING SHRUBBY WETLAND VEGETATION

The shrubby plant materials chosen for the stabilization project are vigorous, quick-growing, have extensive root systems and are well-adapted to wet conditions. However, if you do not want them to reach the maximum size, some pruning will be required. Pruning is the removal of shoots and branches to control the growth of a plant. In this case, you may want to keep them low enough to view the lake, or gain easy access to the lake.

Pruning is not a difficult task if the following general principles are followed:

- Rather than waiting a few years after the shrub is too large, begin pruning the year that your shrub has reached the desired height. Remember to use sharp pruning shears, do not tear the branch, cut right through and as close to the shoot as possible
- Light pruning can be done at any time of the year, but it is best to do it before the period of rapid growth, which is in the early spring.
- Branches in desired positions can be encouraged if you pinch back or remove competing shoots.
- Visualize what the plant will look like with the branch in question removed.



The shrub in the center can be pruned so that it becomes more spreading (left) or more upright (right). Note: the short stubs have been left to indicate where the cuts have been made. Once the desired form (spreading or upright) is obtained, prune to your desired height.

Figure 3

Pruning Shrubby Vegetation

WHAT YOU SHOULD KNOW ABOUT CHOSEN PLANT VARIETIES

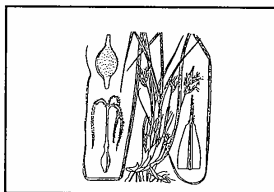


The information is intended to help you know a little bit more about the plant varieties that you have chosen for the Shipshewana Lake Shoreline Stabilization Project.

The following plants are adapted to the wet conditions found on the shores of Shipshewana Lake and are also native to the area.

Grassy Wetland Vegetation

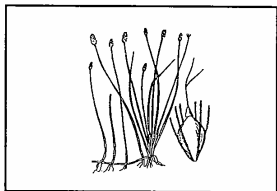
Once the grassy wetland vegetation is planted within the coir fiber bundles it will not spread out much further than the edge of the lake, because it will not flourish in water that is more than one foot deep.



Black-Edged Sedge (*Carex floridana*)-This grassy wetland plant is bright green, wiry, 2-8 feet long with 1-2" leaves. This type of sedge is a common wetland plant found from Virginia to Florida and Texas.



Blue-Flag Iris (*Iris prismatica*)-This beautiful blue-flowering iris is almost grasslike, bearing 2 or three leaves. It is a common wetland plant found from Nova Scotia to Pennsylvania and Georgia. It will stabilize the shore, while beautifying it as well.

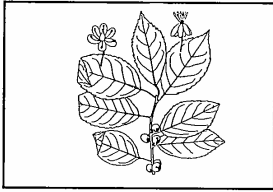


Bright Green Spike Rush (*Eleocharis olivacea*)- This grassy, bright green, spike rush grows from 1-4 feet high. It is common to wet soils from Main to Michigan, Pennsylvania, South Carolina and Kansas.

Shrubby Wetland Vegetation



Willow species (*Salix sp.*)-There are several varieties of willow shrubs, and they are well-known for their fast growth rate and extensive root systems. The Purpleosier Willow (*Salix purpurea*) is a rounded, finely branched and dense shrub which ranges from 8-10 feet. The long shoots have fine, long leaves, and are ideal for wet areas especially to stabilize banks.

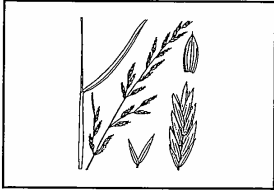


Common Winterberry (*Ilex verticillata*)-Also known as Michigan Holly, this plant is a rounded, deciduous shrub with dense fine twiggy branches. The leaf color is deep rich green in the summer, it grows at a medium rate, and is sized between 6 and 10 feet.

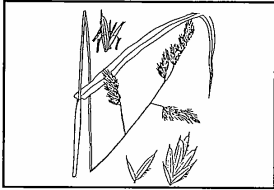


Redosier Dogwood (*Cornus sericea*)-The stem of the Redosier Dogwood is slender, upright and dark blood red. This multi-stemmed shrub has horizontal branches at the base, spreads by underground stems, has a growth range of 7 to 9 feet, and can spread ten feet or more. It grows at a fast rate, is quite vigorous, and is eye appealing in a winter setting due to its brilliant red color.

Upland Grasses



Tall Fescue (*Festuca elatior*)-Also known as Meadow Grass, this tall, slender grass species is quite common to lawns, and is found in fields throughout the United States and Southern Canada.



Orchard Grass (*Dactylis glomerata*)-Another name for this popular upland grass, is Cock's Foot, which is indicative of the shape of the seed clusters. This grass is originally from Europe, but is now found in lawns and fields throughout this country.



Kentucky Bluegrass (*Poa pratensis*)-Most people know about this common, native, green grass. It can be purchased in most garden stores, because it makes for a hardy lawn, but it is also widely cultivated for pasture and as hay.